Computational Linguistics @ UIUC

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Computational Linguistics ⊆ Artificial Intelligence

- Goal:
  - to understand the nature of intelligence,
  - to engineer systems that exhibit intelligence.
- AI labs:
  - Build systems / robots that mimic the human behavior / mind.
  - MIT lab: vision, robotics, and natural language processing – keys to understand intelligence
  - UIUC: NLP/CL, speech recognition, computer vision;

What is Computational Linguistics?

- an area that is concerned with the creation of computer systems for the purpose of performing various NL tasks:
  - Reading/writing a book
  - Holding a conversation
  - Machine Translation
  - Searching for useful and hidden information
- BUT also an area in which computer systems are used to give insights into complex language issues
  - Computational models of psycholinguistic processes
  - Computational models of historical development
  - Models of language acquisition
  - Insights into second-language learning
- plays an increasing role in curbing the information on Internet.

Computational Linguistics @ Ling/UIUC

- People:
  - Jennifer Cole
    - Phonology and computational linguistics, speech processing, cognitive science, and mathematical linguistics
  - Roxana Girju
    - Computational linguistics, computational semantics, textual entailment, machine translation, question answering
  - Chilin Shin
    - Phonetics, phonology, prosody modeling, tone and intonation, speech technologies, second language fluency
  - Marina Terkourafi
    - Sociolinguistics, pragmatics, cognitive linguistics, discourse analysis, computational pragmatics, Greek linguistics, history/use of the Cypriot dialect

So, why is CL a nice research area?

- A lot of room for improvement
  - Language ambiguity
  - World knowledge
  - Culture differences
  - Context
- NLP has a multidisciplinary nature:
  - Linguistics
  - Psycholinguistics / cognitive psychology
  - Computational linguistics
  - Philosophy
  - Artificial intelligence
  - NL Engineering

Why Study Computational Linguistics?

- To get a job in industry
- To get a job in academia:
  - As a computational linguist
  - computational literacy and an understanding of computational methods will become critical in the next decade.
A little bit about <Roxana>..

- I am an Assistant Professor in Linguistics with appointments in Computer Science, Beckman Institute, and Spanish Italian and Portuguese;
- An experience of 10 years in Computational Linguistics;
- Worked both in academia and industry

Semantic Frontiers Group

- http://apfel.ai.uiuc.edu/index.html
- Our goal is to investigate computational natural language semantic and pragmatic models for intelligent information access.
- In particular, we are interested in exploring and building:
  - semantic models of lexical and relational semantics (Sem. Par.)
  - computational explanation models (QA, TE)
  - semantic and pragmatic inference systems (TE)
  - And more!

Semantic Frontiers Group: Projects

- Semantic Parsing
  - We won the Intl. competition at SemEval 2007!
  - Application: Question Answering
    - Q: What can cause malaria?
    - A: malaria mosquitoes affected large areas ..
- Domain-Specific Knowledge Base Construction
  - Tool to acquire information and organize it in knowledge structures that can be used for reasoning
    - applications:
      - Question Answering, Text Summarization, Information Retrieval
      - Attempts to give a computer a knowledge of the world
- Textual Entailment
  - Automatic Reasoning
- Machine Translation

CL: Courses Offered

- LING402 Tools and Techniques for Speech and Language Processing
- LING270 Language, Technology and Society
- LING406 Introduction to Computational Linguistics
- LING591 – Special Topics in CL
  - ..

ADVANCED STUDY IN LANGUAGE AND SPEECH PROCESSING AT UIUC

- LSP is a multidisciplinary program for doctoral students with an interest in speech and language processing technology.
- Is open to students who are pursuing a Ph.D. in the Departments of Linguistics, Electrical and Computer Engineering, Computer Science, and the Graduate School of Library and Information Science.
- Students would earn a Certificate of Advanced Study in Language and Speech Processing, in addition to the Ph.D.
- Students will take courses from a specified list, and work with a program-affiliated faculty member; faculty members affiliated with the program have appointments in one or more of the following departments:
  - Linguistics, Electrical and Computer Engineering, Computer Science, Library and Information Sciences.

http://lsp.lang.uiuc.edu/

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Thank you!